Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

DEMONSTRATION OF A US VERSION OF THE LIGHTWEIGHT RUSSIAN K-36/3.5 EJECTION SEAT

The United States (US)-equipped K-36/3.5 ejection seat has been demonstrated to be an affordable ejection seat option with unparalleled safe escape capability. With redesigned pyrotecnics and electronics, the Russian lightweight K-36/3.5 ejection seat accommodates the full (expanded) size and weight ranges of US aircrews; enhances low-altitude, adverse-attitude ejection performance; and provides high-speed escape capability up to 700 knots equivalent airspeed.

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Accomplishment

The Human Effectiveness Directorate recently completed an advanced development effort to design and demonstrate pyrotechnics and electronics for a Russian-made lightweight K-36/3.5 ejection seat. This effort ultimately met the demanding US requirements such as a greatly increased pilot population, more severe operational environments, and increased reliability, without increasing the system weight or the performance intended by Russian designers. The US-equipped K-36/3.5 ejection seat was renamed the K-36/3.5A.

Background

The Russian lightweight K-36/3.5 ejection seat deploys a unique stabilization system of telescoping booms by the time the seat leaves the cockpit. The ejection seat integrates subsystems such as leg lifters, leg and arm restraints, windblast protection, and a vented helmet designed to interface with the seat headrest.

This effort required US manufacturers to design propellant charges to ensure safe escape during emergency conditions for extremes in US pilot population from small 103-pound to very large 245-pound aircrew. The manufacturers also designed new initiating devices and propellants to avoid premature ignition during US operations. New initiating devices and propellants include higher electromagnetic interference from radar emissions and the ability to operate reliably at temperature extremes of 65º hotter than the Russian-designed maximum.

The manufacturers redesigned the electrical systems, including the signal conditioning and sequencing systems, to eliminate single point failures and use a seat-mounted power source. The directorate conducted system level verification tests to demonstrate that the US version maintained the performance of the Russian version. US-manufactured energetics maintained the demonstrated capabilities of the Russian-made K-36/3.5, making it an affordable ejection seat option that provides safe escape for all aircrew members throughout current fighter aircraft flight envelopes.

Human Effectiveness
Support to the Warfighter

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (02-HE-11)